

Mat 105 Exam 2 Review**Name:** _____

1. Answer true or false and then justify your answers using correct mathematical terminology.

A. $5 \times (4 \times 3) = (5 \times 4) \times (5 \times 3)$ by the distributive property

B. $7 - (5 + 3) = (7 - 5) + (7 - 3)$ by the distributive property

C.
$$\frac{2x - 4}{3x} = \frac{2\cancel{x} - 4}{3\cancel{x}}$$

D. $7 \times (2 + 3) = (7 \times 2) + (7 \times 3)$ by the distributive property

E. $8 - (2 + 3) = 8 - 2 - 3$ by the additive inverse property

F. $\sqrt{x^2 + y^2} \neq \sqrt{x^2} + \sqrt{y^2}$ since you cannot distribute an exponent across addition or subtraction.

G. $0 \div 12 = \text{undefined}$.

H. $12 \div 0 = \text{zero}$

2. Factor completely all polynomials below.

A. $ab + xv - xb - av$

B. $2x^2 - 7x + 5$

C. $100x^2 - 1$

D. $16x^3 - 54$ (hint factor greatest common factor out first)

E. $5x^2 - 2x - 3$

F. $8x^3 + 125y^3$

G. $54 - 16y^3$

H. $8a^3 - 18ab^2$

I. $12a^3 - 3a$

J. $16a^4 - 81b^4$

K. $1 - x^4$

L. $p^3 + 8q^3$

M. $4q^3 + 32p^3$

N. $27a^6 - 125b^3$

O. $8a^3 - 27b^3c^3$

3. Perform the following operations as necessary in the problems below (assume that the variables assume appropriate values so that all denominators are non-zero real numbers and radical terms are not undefined).

A. $(3x^3 - 4x + 6) - (-7x^3 - 5x^2 + 4x + 7)$

B. $(4x^3 - 5x + 7) - (-8x^3 - 9x^2 + 7x + 8)$

C. $f(x) = 4 + 3x^2$, $g(x) = 2x^3 - x^2 + 1$, find $(f + g)(x)$

D. $-\frac{2x}{x^2yz^3} - \frac{3y^5}{x^2y^{12}z^{12}}$

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E. $-3\frac{4}{5} - 5\frac{1}{3} + 4\frac{11}{15}$

F. $-3\frac{1}{5} - 2\frac{1}{3} + 1\frac{3}{15}$

G. (Write your final answer in the simplest terms)

H. $\frac{2x+5}{16-9x^2} - \frac{x+1}{4+3x} - \frac{4}{4-3x}$

I. $\frac{5x}{2x^2+x-1} - \frac{3}{x+1} - \frac{2x}{2x-1}$

J. $\frac{-5^2-3 \times 4^2-25 \div 5}{(10-(-5)^2)^2}$

(Write your final answer in the simplest terms.)

K. $5\sqrt[3]{2a^5y^7} + 7ab^2\sqrt[5]{a^3b^2} - 8ay^2\sqrt[3]{54a^2y} - \sqrt[5]{32a^8b^{12}}$

L. $2\sqrt[3]{2a^2y} + 3ab^2\sqrt[5]{a^3b^2} - 4\sqrt[3]{2a^2y} - 11ab\sqrt[5]{a^3b^2}$

M. -34.15×0.0013

N. $(2x - 5)^2$

(Perform the multiplication and write in the expanded form.)

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O. $\left(\frac{5x^5y^{-3}}{9x^{-4}y^3}\right)^{1/2}$

P. $\left(\frac{24x^{-3}y}{3x^5y^7}\right)^{-\frac{1}{2}}$

Q. $\frac{3x^2-17x+10}{18x^2-8} \div \frac{8x^3-27}{6x^2-5x-6}$

R. $\frac{2+4\sqrt{3}}{3-5\sqrt{2}}$

S. $\frac{3+2\sqrt{3}}{2-3\sqrt{2}}$

T. $f(x) = 3x - 1, g(x) = x^2 + 1, \text{ find } \left(\frac{f}{g}\right)(5).$

U. $342 \div 23$ (show all your work using long division)

V. $(12x^3 - 11x^2 + x + 7) \div (3x + 1)$ (show all your work using long division)

$$W. \frac{\frac{a-b}{b-a}}{\frac{a-b}{b+a}}$$

$$X. \frac{\frac{x}{y}+1}{\frac{x^2}{y^2}-1}$$

4. Draw rectangles to represent each step of the factor by grouping process described below.

A. $3a + ay + 3b + by = a(3 + y) + b(3 + y) = (a + b)(3 + y)$

B. $uv + vv + uy + yv = v(u + v) + y(u + v) = (v + y)(u + v)$

5. Factor the following polynomial using algebra tiles. Draw each of your pieces carefully. Do not use algebra to factor.

A. $3x^2 + 8x + 4$

B. $2x^2 + 5x + 3$

C. $4x^2 + 8x + 3.$